

## CHAPTER 4.000

### TRANSPORTATION

#### 4.100 GENERAL

The purpose and intent of this chapter is to establish minimum standards for the planning, design, and construction of both public and private roadways, certain associated facilities and pedestrian and bicycle accommodations within the County. The chapter is divided into five sections establishing guidelines and criteria for Transportation Planning, Design and Construction Standards, Pedestrian and Bicycle Accommodations, Street Name and Addressing Standards and Signs. It is the intent of the County of Loudoun that all roads be dedicated for public use and maintained by the Virginia Department of Transportation (VDOT), except as may be permitted under the provisions of the Zoning Ordinance or the Land Subdivision and Development Ordinance (LSDO).

#### 4.200 TRANSPORTATION PLANNING

##### A. General Requirements

##### 1. Roadway Classifications

Public roads constructed in conjunction with subdivision and site plans shall be designed to comply with the standards of the Virginia Department of Transportation (VDOT) and this chapter of the Loudoun County Facilities Standards Manual (FSM).

For purposes of this chapter, private roadways shall include: private roads, pipestem driveways, townhouse and multi-family accessways, private lanes, private access easement roads, Class III roadways, private rural village through roads and neighborhood roads as referenced within the Zoning Ordinance and LSDO. Private roadways shall be designed to comply with the standards outlined in this chapter for the appropriate roadway category as described below.

- a. Category A: Includes Private Roads for residential and non-residential applications, Private Rural Village Through Roads; Private Rural Village Neighborhood Road; Class III Roads serving more than 25 lots.
- b. Category B: Includes Townhouse, and Multi-Family Accessways (which includes condominiums).
- c. Category C: Includes Class III Roads serving 25 lots or less; Pipestem

Driveways; Residential Private Access Easement Roads; Private Lanes; Alleys.

## 2. Facility Planning Guidelines

- a. The streets within and contiguous to any development shall be designed and constructed so as to ensure coordination with other existing or planned streets within the general area as to width, grade, location, and drainage. Existing and planned streets shall be deemed to include, without limitation, streets depicted in the Comprehensive Plan and existing or planned streets in existing or future adjacent or contiguous to adjacent subdivisions. For purposes of this paragraph 2.a, "Streets" includes "Roadways" as described in this Chapter 4.
- b. When a subdivision or other development site abuts one side of any public road in the State highway system, the subdivider shall be required to dedicate one-half of the total right-of-way or easements necessary to make such road conform to VDOT and County standards, including accommodations for pedestrians and bicycles. The subdivider may be required to dedicate more or less right-of-way or easement to make appropriate horizontal and vertical adjustments to such road.
- c. Vehicular access from off road parking and service areas shall be so combined, limited, located, designed, and controlled so as to channel traffic from and to such areas conveniently, safely, and in a manner that minimizes traffic friction and promotes free traffic flow on roads without excessive interruption.
- d. Whenever a proposed development contains or is adjacent to an arterial or major collector road, direct access shall be evaluated and the Director may require that provisions be made for the future elimination or reduction of direct access through methods such as the creation of a parallel road system, combined lot access, and other methodologies as determined appropriate.
- e. Shoulder and ditch section roadways are encouraged and may be provided as a low-impact design measure, as defined in Chapter 5 of this manual. Curb and gutter roadway sections shall be provided for developments within the Route 28 Taxing District and within the following zoning districts: PD (excluding PD-RV and PD-CV), R and CLI. The low-impact drainage design within residential developments shall also meet the swale and open channel specifications, as set forth in Chapter 5. Shared-use trails shall be provided in conjunction with shoulder and ditch roadway sections in developments in the Suburban Policy Area, the Transition

Policy Area, the Joint Land Management Area, and in Rural Villages. **In developments** where lot sizes **of** one acre or less are **proposed** ~~planned~~, sidewalks may be provided in lieu of shared-use trails.

- f. Reserve strips (spite strips) controlling access to public roads shall be prohibited as defined in the VDOT Subdivision Street Ordinance.
- g. Per the Zoning Ordinance, in Planned Development Housing Districts only, no more than eighty (80) dwelling units shall be permitted to be served by a single point of access directly to publicly maintained roadways or indirectly to a publicly maintained roadway via an appropriate access easement.
- h. The transportation system proposed for subdivision or other development shall safely accommodate non-motorized users. Design shall address both internal circulation as well as connections to existing and planned contiguous roads and bike and pedestrian facilities. In the absence of existing and planned contiguous bike and pedestrian facilities, reservations are encouraged to the most logical access points for adjacent parcels.
- i. Where required by the Zoning Ordinance, interparcel connections for both vehicular and non-motorized users shall be provided.

### 3. Traffic Calming

The County promotes the use of traffic calming measures to improve safety for non-motorized street users and pedestrians in accordance with VDOT's adopted policies and standards. During street layout and design, the issue of traffic calming should be considered. Early consideration can minimize future speeding problems and improve the livability of the neighborhood. If the street layout cannot be designed to encourage target speeds, traffic calming treatments may be appropriate. The type of treatment chosen for incorporation in the design depends on the function and traffic volume of the roadway segment. When traffic-calming measures are proposed, such measures may be shown on the preliminary subdivision plat, and shall be shown on construction plans and profiles and site plan submissions. If desired, a comprehensive traffic calming design, designating proposed measures such as but not limited to signage, striping, narrower roadways, chokers, raised crosswalks and roundabouts, can be submitted for review and approval for the entire development with the first preliminary subdivision application. In such cases, subsequent applications shall make reference to the approved comprehensive traffic calming design and the traffic calming measures should be appropriately provided on the current application.

## B. Traffic Studies

1. General
  - a. Traffic studies required for zoning map amendments and special exception land development applications or otherwise required by VDOT shall be used to determine the site specific and regional impact to the existing or planned roads within the County.
  - b. The performance standards of traffic studies as contained within this chapter are intended to be a general guideline. However, the specific details, methodologies, and study requirements shall be confirmed and agreed upon by the County and the applicant in writing prior to the formal submission of the study. Additional requirements may be imposed by VDOT.
2. Pre-Submission Requirements, Policies, and Procedures
  - a. Prior to submitting a traffic study, the applicant shall submit a written request to the Office of Transportation Services for a traffic study "scoping" meeting and/or a request to modify the requirements of a traffic study. The intent of this meeting is to identify elements of the study and resolve issues associated with the study to promote a complete and effective submittal by the applicant and a timely review by the County. This request shall include the following information and details:
    - i. A vicinity map and parcel identification number of the subject site, and if available, a conceptual development plan should also be provided.
    - ii. Identification of the points of ingress/egress for the subject site.
    - iii. The existing and proposed land use(s) and square footage or number of residential units, if applicable, for the subject site.
    - iv. A list of traffic issues and considerations associated with the subject site and application.
    - v. Where appropriate, justification of reduced study standards or a waiver of further study requirements.
  - b. The County shall hold a traffic study scoping meeting or respond in writing that further traffic study information is not required, within ten (10) working days of receipt of a written request. The County shall invite VDOT to the meeting. Upon notification of the date and time for the scoping meeting, the County will advise the applicant of additional materials that would facilitate an effective and resourceful meeting. The applicant is encouraged to provide such additional materials prior to the

meeting if possible.

- c. The County checklist, reflecting the technical performance standards as outlined in this Section 4.200.B, shall be used to identify and clarify the specific traffic study requirements. This checklist shall also document the agreements made during the course of the scoping meeting. At the conclusion of the meeting, the participants shall sign the checklist document in confirmation of the meeting discussion and results. Copies of this document shall be provided to the applicant and the County for future reference. Unless a scoping meeting is not required, a copy of this signed document **must** be submitted with the traffic study to aid in the acceptance of an application during the review of the traffic study.
- d. If during the traffic study scoping process, it is determined that certain performance standards and requirements as provided in this chapter are not applicable to the requested land use, this decision shall be so documented on the checklist document. This document shall constitute a modification of the traffic study performance standards and requirements set forth in this section of the chapter.

3. Post-Submission Requirements, Policies, and Procedures

- a. Upon receipt of the traffic study, the County shall use the traffic study scoping meeting checklist document to verify that the agreed upon components of the study have been provided. This verification shall be limited to confirmation that the provided traffic study includes the materials noted on the checklist. If the study is found to be incomplete due to non-compliance with the scoping meeting checklist document, it shall be rejected and returned to the applicant.
- b. Upon acceptance of the traffic study, the County shall provide the applicant with written comments per the timelines consistent with the type of application, e.g., within thirty (30) calendar days for SPEX, sixty (60) calendar days for ZMAP and ZCPA. If necessary, a post-submission meeting(s) shall be scheduled by the County to discuss and clarify outstanding issues.
- c. When applicable, the applicant should respond to outstanding comments and issues generated by the County per the timelines consistent with the type of application for its processing, but usually within thirty (30) calendar days.
- d. Once major outstanding issues with respect to the review of the traffic study have been resolved and the applicant has submitted a set of draft proffers consistent with the resolutions reached on the traffic study issues,

the County shall review and evaluate the traffic study and draft proffers in unison to confirm that the infrastructure improvements and associated access requirements are consistent with the Comprehensive Plan and the submitted technical analyses.

4. Content of Traffic Studies

- a. Study Area: Roadways internal or adjacent to the development site shall be included in the traffic study. The study area should be defined at the scoping meeting and as a guideline should include other external roads to the extent that the project's generated traffic is anticipated to exceed 10 percent of the road's current/existing traffic volumes (at the time of application).
- b. Traffic Counts: Traffic counts are required on the adjacent roads and in the adjacent intersections beyond the project's frontage on adjacent roads in the study area. The AM/PM peak period traffic counts shall not be more than twelve (12) months old at the time of the application submission. Twenty-four hour weekday traffic counts or estimates are also required for roadway segments.
- c. Trip Generation: As a general guide to vehicle trip generation, the latest edition of the Institute of Transportation Engineer's (I.T.E.) Trip Generation Report shall be used. These rates may be supplemented by additional information provided by the County. If the applicant chooses to use different rates, they shall be documented and agreed to at the scoping meeting prior to their use in the traffic analyses. Primary trip reductions associated with passby trips and methodologies for trip reductions associated with passby trips shall be discussed and agreed upon at the scoping meeting.
- d. Traffic Volume Projections: The traffic study shall include an agreed upon build out year and provide existing and projected traffic volumes, with and without the subject project, for Average Daily Traffic , as well as AM and PM peak hours. The peak hour of the project/individual land use(s) (as given in the ITE Trip Generation Report) should be added to the corresponding AM/PM existing peak hour of the adjacent roadway traffic volumes (to show the worst case scenario), if the peak hour of the project/individual land use(s) for the generator is greater than the peak hour of the adjacent roadway (per ITE Trip Generation Report). The existing peak hour of traffic on the roads adjacent to the subject project site shall be identified. These traffic volumes shall be provided at roadway intersections and commercial or private accessways/entrances.
- e. LOS Analyses: Level of Service (LOS) calculations for existing and

projected conditions, with and without the subject project, for highway segments, intersection legs, and entrances shall be provided. Calculations shall be in accordance with the Highway Capacity Manual (HCM) and/or the Highway Capacity Software (HCS), or as may be agreed at the scoping meeting. Traffic volumes and level of service information shall be provided for each phase of development, to include conditions at date of project completion. Projections shall also be made for date of completion plus ten (10) years or to an agreed upon forecast year.

- f. Minimum Roadway/Intersection LOS Standards: Recommendations for phased improvements to the road network links in order to maintain an acceptable level of service (minimum LOS "D") shall be provided. For each phase up to and including buildout, a minimum approach and overall LOS "D" at intersections shall apply.
- g. Background Traffic Assumptions: Assumptions which determine projected background traffic, including through traffic growth rate to be applied on roadway links, shall be confirmed at the scoping meeting. The sources for determining future traffic projections will include one or more of the following:
  - The Loudoun County Growth Summary or similar documents from Loudoun County.
  - The Loudoun County transportation model which incorporates COG's Cooperative Forecasts for Loudoun County.
  - Approved developments in the vicinity of the proposed development.

Specific other approved development names and respective development square footage or residential units used in the study shall be provided.

- h. Traffic/Trip Distribution: Directional trip distribution information shall be provided for project entrances and collector and arterial intersections within the study area for the phases and categories (e.g., residential, office, retail, industrial and institutional) of development.
- i. LOS Calculation Assumptions: Traffic counts and level of service (LOS) worksheets and projected traffic volume level of service (LOS) analyses, using agreed upon analysis techniques, including existing AM/PM peak hour signal timing, shall be included as a part of the traffic study.
- j. Mode Choice: Modal split information shall be provided for the phases of the analysis, with sources of information identified (e.g., COG model).
- k. Safety Locations: Road safety hazards, as identified by the ISTEA set-aside funding criteria and/or as identified by the County at the scoping

meeting, within the study area shall be analyzed for all roadway links and intersections in the traffic study.

- l. Traffic Mitigation Measures: If trip reduction factors are used in the study, measures necessary to implement the reduction must be specified, with supporting documentation.
- m. When bicycle and pedestrian accommodations are used to reduce anticipated traffic volume, a description of the physical and functional characteristics of the proposed bicycle and pedestrian accommodations shall be provided. If such separate bicycle accommodations (e.g., striped lanes or multi-purpose trails) are anticipated, they shall also be identified. A description of the functional characteristics shall be provided to identify the transportation options that these accommodations provide (e.g., pedestrian access to retail center, safe bicycle route to elementary school, inter-parcel connections to adjacent neighborhoods, access to W&OD trail, etc.)

C. When required by the Zoning Ordinance, Average Daily Trips in VPD shall be calculated using the latest version of the ITE Trip Generation Report unless otherwise specified by the County.

#### 4.300 DESIGN AND CONSTRUCTION STANDARDS

The following standards are intended to protect the public health, safety and welfare in addition to enhancing transportation efficiency.

##### 4.310 GENERAL DESIGN REQUIREMENTS

- A. Roads shall be configured to avoid floodplain unless no other alternative alignment is feasible, and to limit stream crossings.
- B. Roads shall be laid out in such a manner as to intersect as nearly as possible at right angles. No roadway shall intersect a public roadway or Category A private roadway at less than 80 degrees except as may be permitted by the Director, where existing topographic conditions and/or design constraints prohibit meeting this requirement.
- C. Road jogs with center lines offsets of less than 225 feet shall not be allowed in Category A private roadways, except as may be permitted by the Director. A road jog is defined as a through traffic movement in an urban or high volume road situation which may make



two changes of directions at successive intersections. See Figure 1 at the end of this chapter. Public street intersection spacing shall be accordance with VDOT standards.

- D. Public roadways and Category A private roadway intersections shall be designed to align with existing or planned roadway intersections.
- E. A road which permanently ends with a cul-de-sac or turn-around (not including dead end roads which end at a temporary turn-around) shall not exceed the lengths set forth below. Measurement of the length shall be taken along the centerline from the road's intersection with an existing or proposed through road to the center of the cul-de-sac or turn around.

<b>Development Type</b>	<b>Allowable Maximum Length</b>
Commercial, retail, industrial, office	1500 feet
Rural Non-residential	3500 feet
Multi-family residential	1000 feet
Single family residential	
Townhouse	1500 feet
Detached	
Zoned 1 unit per acre or greater density	2500 feet
Zoned less than 1 unit or lot per acre	3500 feet

Additional criteria for cul-de-sacs or turn-arounds include:

1. Grades for cul-de-sac turnarounds shall not exceed 6 percent measured along face of curb or edge of pavement.
2. The geometry for a cul-de-sac or turn around shall have a radius of no less than 40 feet at the property line and no less than 30 feet at the face of curb or edge of pavement line. Other types of turn arounds may be considered for private roadways.
3. Developments with a single point of ingress/egress shall provide a secondary point of access for emergency vehicle use if the length of road, measured along the centerline from the point of beginning of the ingress/egress to the front of the most remote lot, exceeds the maximum allowable length as may be permitted by the Director. Such emergency vehicle access easement shall be an 18 foot wide

easement, which shall contain a 14 foot wide graded and compacted travelway, centered in the easement. The grade or slope of the emergency vehicle access travelway shall not exceed 10 percent at any point along the centerline in the travelway. A typical section of the proposed emergency vehicle access easement and travelway shall be included in the land development submission.

Multi-phased developments, with an approved concept development plan or preliminary plat showing more than one ultimate point of access, shall not be required to meet this requirement for individual phases, sections or plats, on ultimately planned through roads.

4. Length criteria as contained within this section shall not be applicable for divided roadways with medians and the above criteria shall apply beyond the point where the divided section ends.
  5. The County encourages the use of landscaped islands within cul-de-sacs.
- F. Landings shall be provided for public roadways and Category A private roadways at intersections to ensure adequate grade and sight distance at intersections. The maximum grade along the landing for Category A private roadways shall not exceed 3% or the cross slope of the intersecting road, whichever is greater. Breakover shall not exceed 6%. The minimum length of landing shall be 50 feet. Landings for public streets shall meet VDOT standards.
- Landings shall be provided for Category B private roadways at intersections. The maximum grade along the landing shall not exceed 6% for 25 feet.
- Landing shall be defined as that section of a roadway which is adjacent to an intersection and utilized for vehicle stacking.
- Breakover is the difference between the centerline grade of an intersection roadway and the cross slope of the intersecting roadway.
- G. Excepting driveway access to single residential lots, roadways intersecting with a public or Category A private roadway shall have a minimum length of 50 feet between curb returns and/or curb cuts. See Figure 2 at the end of this chapter.
  - H. On curb and gutter sections, except for Category B private roadways, the roadway right-of-way, or easement where applicable, shall extend a minimum of six feet beyond the face of curb so that drainage structures can be accommodated.
  - I. Signage and fire lane marking shall be in accordance with Chapter 7 of this manual.
  - J. Pavement designs will be done in accordance with Section 4.340.

K. Residential driveway entrances in curb and gutter road sections shall be constructed in accordance with the figures located at the end of this chapter.

L. On segments of proposed roadways with ultimate projected traffic counts of more than 2000 Vehicles Per Day (VPD), there shall be no direct access from any driveway or pipestem that serves three (3) or fewer dwelling units unless traffic calming measures approved by the Director are employed. On segments of proposed roadways with ultimate projected traffic counts of more than 4000 Vehicles Per Day (VPD), there shall be no direct access from any driveway or pipestem that serves three (3) or fewer dwelling units.

#### 4.320 PUBLIC ROADWAY STANDARDS

A. Public roadways shall be designed to conform to the requirements of the applicable Virginia Department of Transportation (VDOT) standards and this manual, except as specifically modified in writing by the Director and VDOT.

B. Where this Ordinance and the standards of VDOT may differ, the more restrictive requirements shall apply.

C. Public roadway construction plans and profiles require review and recommendation by VDOT.

#### 4.330 PRIVATE ROADWAY STANDARDS

A. General

The following shall apply to the categories of private roadways, except as noted herein:

1. Traffic control signage and lane markings provided on private roadways shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). When a signal is warranted, signalization shall meet VDOT standards.
2. Private roadways may be designed with a curb and gutter section or a shoulder section. Shoulder sections shall have stabilized shoulders which may be a paved, gravel, or sodded grass surface. Shoulders shall meet VDOT slope requirements.
3. Private roadways shall be designed to accommodate an SU-30 design vehicle (AASHTO) and to accommodate emergency vehicles in accordance with the design criteria contained within Tables I, II and III of this chapter. The travel way inside radius at an intersection shall be a minimum of 25 feet, except for alleys.
4. Where parking is provided on the roadway, pavement width shall be increased

appropriately. Parking geometry designs shall meet the requirements of this chapter.

5. An entrance permit shall be secured from the Virginia Department of Transportation in order to tie into an existing VDOT maintained road.
6. Sidewalks shall be placed within the public access easements. Handicap accessible ramps and provisions, in accordance with State and Federal requirements, shall be provided at roadway intersections with curb gutter.
7. Roadway design details which are not standard designs used by VDOT, such as CG-6R or YI-1 components, shall be submitted as detailed drawings to the Director for approval.
8. All private roadways and access easements identified in this chapter that serve 3 or more lots, require construction plans and profiles and an approved Performance Bond prior to record plat approval for the subdivision the roadways or access easements are to serve.

**B. Category A Roadways**

1. Category A private roads may be utilized in locations as permitted in the Zoning Ordinance, LSDO, and in locations where private roads have been permitted through a Zoning ordinance Modification for residential and/or non-residential applications.
2. The width of the access easement within which a private roadway is located shall extend to the property lines and along the entire length of the property lines along the frontage of the individual lots to which it provides access. However, this requirement does not always require the construction of the frontage improvements along the entire property line. The following minimum criteria shall apply:

**Roadway Cross Section Easement Limit**

Curb and Gutter - Six feet behind the face of curb.

Shoulder Section - The edge of shoulder and as necessary to accommodate roadside drainage.

3. Category A private roadways shall have a paved surface. For minimum standards regarding pavement section, widths, etc., refer to Table I.
4. Utility easements shall be provided, as necessary.
5. Category A roadways shall require construction plans and profiles for review and

approval.

**TABLE I**

<b>Type</b>	<b>Average Daily Traffic (in VPD)</b>	<b>Lane Width *</b>	<b>One-Way Width</b>	<b>Shoulder Width</b>	<b>Curve Radius (Min.)</b>	<b>Stopping Sight Distance</b>	<b>Maximum Grade</b>	<b>Vertical Curve Design</b>	<b>Minimum Intersection Sight Distance</b>
A1	1-250	9 feet	16 feet	2 feet **	110 feet	150 feet	12%	20 mph	200 feet
A2	251-999	10 feet	N/A	4 feet	165 feet	150 feet	12%	25 mph	250 feet
A3	1000-3000	11 feet	N/A	6 feet	165 feet	150 feet	10%	25 mph	250 feet
A4	3001-5500	12 feet	N/A	6 feet	338 feet	200 feet	10%	30 mph	300 feet
A5	5500+	12 feet	N/A	6 feet	478 feet	275 feet	8%	35 mph	350 feet

\* Does not include gutter pan.

\*\* Shoulders must be treated/compacted to support emergency vehicles.

Notes:

1. Turn lanes shall be required at entrance locations with Average Daily Traffic in excess of 5500 VPD, if warranted based on the peak hour traffic volumes, per Appendix C of the VDOT Road Design Manual. Such turn lanes may be required on both the public and private legs of an intersection, if applicable.
2. Roadways in excess of 3,000 VPD shall be superelevated in accordance with the VDOT Road Design Manual.
3. Required thickness of subbase, base course, and top or surface course for private roads shall be determined based on projected Average Daily Traffic volumes for the roadway or segment, using the VDOT Subdivision Street\_Requirements, if Average Daily Traffic exceeds 250 VPD.
4. The minimum pavement section for private roadways with a projected Average Daily Traffic of less than or equal to 250 VPD shall consist of 6 inch aggregate base course and a 2 inch bituminous surface course on a properly compacted subgrade.

**C. Category B Roadways**

Locations permitting Category B facilities shall include townhouse and multi-family

uses. Category B facilities are defined as private vehicular facilities in residential townhouse and multi-family areas (including condominiums) which serve the following functions: 1) provide individual lot frontage or access, 2) provide for parking, and 3) carry predominantly on-site traffic. Category B roadways shall be used only where a volume of less than 1,000 VPD is anticipated. Where 1,000 VPD or greater are anticipated, use design standards specified for Category A roadways. Design of Category B roadways shall meet the minimum standards as defined for Type B1, B2 and B3 below and shall require construction plans and profiles or site plan submissions, whichever is applicable.

**TABLE II**

Type	Average Daily Traffic (in VPD)	Travelway Width (2-way)	Travelway Width (1-way)	Centerline Curve Radius	Stopping Sight Distance	Maximum Grade
B1	1-250	25 ft.	18 ft.	36 ft.	90 ft.	8%
B2	251-750	25 ft.	18 ft.	60 ft.	120 ft.	8%
B3*	751-1000	25 ft.	18 ft.	60 ft.	120 ft.	8%

\* Angle parking is not allowed on Type B3 roadways. Parallel parking is allowed on Category B private roadways with additional pavement in accordance with the standards established in this chapter.

1. Roadways and parking areas shall have a curb section and shall be contained within an access easement. The width of the access easement in which a Category B private roadway is located shall extend to the property lines and along the entire length of said property line of the individual lots to which it provides legal access. However, this requirement does not always require the construction of the frontage improvements along the entire property line. On sections of the roadway where this requirement is not applicable, the easement shall be established one foot behind the face of curb or six inches behind the sidewalk.
2. For Type B2 and B3 roadways, intersections shall be spaced at least 50 feet apart, measured from the flow line of the gutter pan. See Figure 3 at the end of this chapter.
3. An intersection is defined as the juncture of at least three segments of roadways at a common point.
4. Category B private roadway intersections onto a public or Category "A" private roadway shall not be placed closer than 100' at centerline. See Figure 4 at the end of this chapter.

5. No parking shall occur for a minimum distance of 30 feet from an intersection, measured from the flow line of the gutter pan. For 3-segment intersections, parking is allowed along the through roadway opposite the intersecting roadway. See Figure 5 at the end of this chapter.
6. Category B private roadways shall not have a posted speed in excess of 15 mph.
7. Travelway widths excluding parking shall be measured from face of curb to face of curb.
8. The minimum pavement section for Category B private roadways and parking areas shall be based on the projected Average Daily Traffic volumes using the VDOT Subdivision Street Requirements if the Average Daily Traffic exceeds 250 VPD.
9. The minimum pavement section for Category B private roadways and parking areas with a projected Average Daily Traffic of less than 250 VPD shall consist of 6 inch aggregate base course and a 2 inch bituminous surface course.
10. A permanent turn-around shall be required when a dead-end roadway exceeds a distance of 500 feet, measured along the centerline from the last intersection with a public or private roadway to the center of the turn-around.

**D. Category C Roadways**

1. Category C private roadways shall be provided for the following:
  - a. Private access easement roads as permitted by the Land Subdivision Development Ordinance (LSDO) and the Zoning Ordinance (ZO).
  - b. Class III roads serving 25 or less lots, as permitted by the LSDO and ZO.
  - c. Pipestem drives as permitted by modification of the ZO. For the purposes of this manual, pipestem drives are defined as a means of access to a lot or several lots which do not have direct access to an abutting roadway other than by the pipestem driveway.
  - d. Alleys as permitted in the ZO.
2. Category C private roadways shall be designed to meet the minimum standards as defined for each Roadway Type C1, C2, C3 and C4 below including the referenced supplemental design criteria.

**TABLE III**



				Materials			
Subdivision Size	Easement Width *1	Travel-Way Width	Shoulder Width *7	Paved	Gravel	Maximum Grade *4 *5	Centerline Curve Radius
C1 (up to 2 lots)	24'	12'	N/A	2" over 4" base (opt.) *3	6"	10%	30'
C2 (3-7 lots)	30'	14'	2' grass	2" over 4" base *3	6"	10%	75'
C3 (8 or more lots)	40'	18' *2	2' gravel	2" over 6" base	6"	10%	110'
C4 (alley) *8	20'	14'	2' grass	2" over 6" base	N/A	12%	N/A

**Footnotes:**

- \*1 Additional easement width may be required at specific locations to accommodate slope maintenance, drainage, sight distance, etc.
- \*2 Travelway widths are permitted to step-down to a Type C1 facility, where the number of lots served is 2 or less.
- \*3 All pipestem drives shall be paved and shall be limited to serving 7 lots.
- \*4 12 percent for pipestems or Category C roads that require paving.
- \*5 Steeper grades may be considered where there are topographic or environmental constraints which prohibit the maintenance of the 10% grade criteria.
- \*6 Refer to Figure 7 for Pipestem Driveway Entrance Standards.
- \*7 Shoulders must be compacted/treated to support emergency vehicles.
- \*8 Refer to Figure 15 for alley entrance to public street.

**3. Supplemental Criteria**

- a. Permanent dead-end Type C3 and C4 roadways which exceed four hundred (400) feet in length, measured along the centerline from the centerline of the last intersection with a public or private roadway to the center of the dead-end, shall include appropriate design provision to

permit vehicular turnarounds.

- b. Type C3 and C4 roadways located within Class III and Class IV soils, as identified by the Interpretive Guide to Soils Maps, Loudoun County, Virginia; shall provide a field determination of CBR values based on actual sub-grade conditions. Quantities of borings required shall be in accordance with Chapter 6 of this manual.
- c. Type C3 roadways constructed of gravel must include a fifty (50) foot paved apron only when accessing an existing paved road.
- d. Type C3 and C4 roadways shall include signage for roadway names, private road identification, and traffic control, as may be appropriate.
- e. The following criteria shall be applicable to the design of Type C1 and C2 roadways constructed as pipestem drives:
  - i. Lots which share a pipestem driveway shall provide a minimum of three parking spaces per residential dwelling outside of the travelway. In addition, these driveways shall be clearly labeled or noted "no parking along driveway" on all plats and plans submitted.
  - ii. The design for pipestems which are to serve more than one lot shall be shown in typical section and on the grading plan of the construction plans, together with turnaround and required utilities, and shall be included in the performance bond for the project.
  - iii. Each pipestem shall be clearly identified as a private drive. A single sign, not to exceed two square feet in area, shall be posted at the entrance of each such driveway, displaying only the words "Private Drive" and the addresses of any residences utilizing the common driveway.
  - iv. No pipestem shall extend a distance of more than 400 feet from the public road to the property which the pipestem serves, or exceed a total length of 800 feet if a loop configuration, measured along the center line between the two intersections with a public or private road.
- f. Alleys are a means of secondary access, and properties served by an alley shall have separate frontage on a public or private roadway.

#### 4.340 PAVEMENT THICKNESS DESIGN STANDARDS

- A. The methods and materials used in the construction of all roads shall conform to the current VDOT Road and Bridge Specification, unless herein modified.
- B. Required thicknesses of subbase, base course, and top or surface course for public roads shall be in accordance with current VDOT standards.
- C. Preliminary subbase depth and pavement design shall be based on an assumed design CBR value of 6, if soil tests have not been performed. For private roadways with an Average Daily Traffic in excess of 750 VPD, soil tests of the as-constructed subgrade shall be performed for the actual determination of CBR value. The required subbase thickness and pavement design may be modified prior to the placement of the subbase.
- D. Pavement thickness referenced for Category A, B, and C private roadways are minimum requirements and shall be increased to account for site specific conditions.
- E. Pavement design assumes that the number of Heavy Commercial Vehicles (HCV), consisting of Trucks, Buses, etc., with 4 tires or greater, will not exceed 5 percent of the total projected traffic. If the total projected traffic includes more than 5 percent of such vehicles, an equivalent projected traffic shall be equal to (Average Daily Traffic (in VPD)) + (20 X Number of HCV over 5 percent).
- F. The minimum pavement section for privately owned and maintained parking areas (including driveways aisles within parking areas) serving individual commercial parking lots with a projected Average Daily Traffic of less than 400 VPD shall consist of a 6 inch aggregate subbase course and a 3 inch bituminous base course, and a 1.5 inch bituminous surface course.
- G. Pavement in commercial areas shall be of a heavy duty design in the major cartways and loading areas, and at dumpster pads to accommodate the anticipated vehicle loads. This design shall be subject to approval of the Director. A minimum 6 inch depth 3000 psi concrete section with steel reinforcement over 4 inches of aggregate shall be used for loading areas and dumpster pad areas.
- H. Alternate equivalent pavement designs may be approved by the Director. When using an alternative equivalent pavement design, the following thickness layers shall apply for roadways in excess of 100 vehicles per day (VPD):
  - 1. Minimum thickness of the aggregate layer used as a subbase is four inches.

2. Minimum thickness of the soil stabilized layer (cement, lime etc.) is six inches.
- 
- I. Alternative pavement design sections shall be encouraged. A request for approval of such designs shall be submitted with the site plan or construction plans and profiles and shall include the basis of design, calculations in accordance with current accepted engineering procedures and a justification for the exception to these standards. Technical information regarding the characteristics of the alternative materials of construction (e.g., brick or concrete pavers, pavement admixtures, pervious pavement, etc.) shall be provided as part of the request. The request may be submitted either as an integral part of the construction plans and profiles or site plans or separately for consideration.

#### 4.400 PARKING GEOMETRIC STANDARDS

##### A. General Criteria

1. There shall be three types of passenger vehicle parking spaces which can be used in parking facilities for automobiles.
  - a. Standard car head-in parking.
  - b. Handicap accessible head-in parking.
  - c. Parallel parking.
2. Where four or more spaces are required by the Zoning Ordinance, parking areas shall be graded, well drained and provided with a surface of bituminous concrete or equivalent paving materials. All parking spaces shall be delineated and striped in accordance with this chapter.
3. Gravel, grasscrete, reinforced grass or gravel systems, or other suitable materials may be used for access and parking areas for agricultural and rural economy uses. Elsewhere, such materials may be used for temporary and overflow parking areas, low volume access ways and, when site conditions warrant, standard parking areas. The parking areas shall be well drained with defined travel aisles and designated parking bays. If, due to the rural nature of the facility, it is not feasible or practical to provide defined travel aisles and designated parking bays, the land development application shall provide a note explaining how this requirement shall be met (i.e., parking attendants, signs, etc.).
4. The County permits and encourages the use of pervious materials.

5. Rain gardens and other low-impact design options, in accordance with Chapter 5 of this manual, may be used to satisfy the landscaping requirements for parking areas, such as landscaped islands and peripheral parking lot landscaping, asset forth in this section and the Zoning Ordinance.

## B. Geometrics

1. The following table shall represent the minimum size requirements for automobile parking spaces, except as specifically modified herein. (See the Zoning Ordinance for the required number of parking spaces per use.)

	<u>Width</u>	<u>Length</u>
Standard Head-In Parking	9'	18'
Parallel Parking	8'	22'

Geometrics for angle parking shall be measured as shown in Figure 14.

2. Aisle widths for standard car parking spaces shall be provided in accordance with the following: 90 degrees - 22 feet; 60 degrees - 20 feet; and 45 degrees - 18 feet. A minimum aisle width of 25 feet shall be maintained adjacent to buildings. The minimum travel aisle width is 18 feet. Travelway aisle width shall be measured from the face of curb if there is no parking and from the back of the parking space where there is parking.
3. The stall width for standard parking spaces when measured between stall striping may be reduced to 8 feet when spaces are separated by double line stripes set one foot apart. (i.e., the pavement area of each space shall remain 9 feet.)
4. Where wheel stops or curbing are provided for parking spaces, a 1 foot reduction in the stall length will be allowed, providing the resulting overhang does not encroach on the required open space areas and/or pedestrian access system.
5. Parking spaces for handicapped persons and related access aisles, accessibility routes and signage for physically handicapped persons shall be provided in accordance with State and Federal requirements.
6. Parking lots shall provide for safe and functional traffic circulation.
  - a. Entrances to parking bays shall be located along the site accessway to avoid blockage of the public right of way by vehicles entering the site. No parking shall be allowed within 30 feet of the entrance, measured from the flow line of the gutter pan. See Figure 5 at the end of this chapter.

- b. The major site accessways shall be clearly defined, with a minimum aisle width of 25 feet measured from face of curb to face of curb at curb returns, and no direct angle parking shall be allowed where anticipated Average Daily Traffic exceeds 1500 VPD. Major site accessways shall accommodate SU-30 and WB-40 design vehicle movements without requiring change of direction. A hierarchy of on site travelways shall be maintained.
  - c. Retaining walls, screen, landscaping and building walls shall be protected from vehicle contact.
  - d. "Overhang" areas which are a part of the required parking space must be graded no higher than 2 inches above the top of the curb, and must not be encroached upon by landscape plantings, signs or other obstructions.
  - e. Loading spaces and dumpster pads shall be accessible by the design vehicle with all parking spaces occupied.
  - f. Where drive-through facilities are proposed, the travelway width shall be a minimum of 10 feet and shall be designed to address safe vehicle stacking.
- 7. Parking areas shall provide for safe pedestrian travel.
  - 8. A permanent turn-around shall be required when the dead-end aisle exceeds 500 feet, measured along the centerline of the dead-end aisle, from the last aisle or public roadway.

#### C. Loading Spaces

Commercial building sites shall provide for loading space in accordance with the Zoning Ordinance. An AASHTO-WB-50 design vehicle shall be accommodated on all commercial sites where the proposed use warrants the same except as may be permitted by the Director where the applicant can show just cause for modification.

- 1. Single Unit Loading Space
  - a. A single unit loading space shall be a minimum of 15 feet in width and 30 feet in length and provide a minimum horizontal clearance of 15 feet; provided, however, that when loading spaces are located alongside each other, additional loading spaces need only be a minimum of 12 feet in width.
  - b. Uses which are required to provide a single unit loading space shall provide an entrance and circulation system which can accommodate an

American Association of State Highway and Transportation Officials  
(AASHTO) SU-30 Design Vehicle.

2. Semi-Trailer Standard Loading Space
  - a. Semi-trailer loading spaces shall be minimum of 15 feet in width and 55 feet in length and provide a minimum horizontal clearance of 15 feet.
  - b. Uses which are required to provide a standard or semi-trailer loading space shall utilize an AASHTO WB-50 design vehicle for planning the entrance and on-site circulation system.
3. Loading spaces shall be accessible to the design vehicle with no more than two backing movements. The circulation pattern for the design vehicle should provide for forward movement only and shall discourage backing movements.
4. Per the Zoning Ordinance, no off-roadway loading area shall be located within any required front yard. Furthermore, no off-roadway loading area shall be used to satisfy the requirements for parking or stacking spaces. Loading areas shall be designed and located in a manner which does not interfere with the free circulation of vehicles within parking or stacking areas.
5. In accordance with the Zoning Ordinance, loading spaces may be provided cooperatively for two or more uses, subject to the approval of the Director, where it is demonstrated that adjacent land uses can be adequately served by a shared loading facility and legal instruments ensuring the permanent availability of off-roadway loading for all such uses are recorded in the land records of Loudoun County.

#### 4.500 DRIVEWAYS

##### A. General Requirements

1. Driveways serving individual residential units shall conform to the design requirements contained in this Chapter and as demonstrated by the Figures at the end of this Chapter to achieve acceptable driveway geometry.

##### B. Design Criteria

1. Driveway slopes shall be 12 percent or less. The slope shall be measured along the driveway centerline from the edge of the right-of-way or private access easement to the garage slab.
2. Driveways located within the Mountainside Development Overlay District or in areas of Steep Slopes may, subject to the approval of the Director, have up to a 16

- percent grade
3. The driveway should maintain the full width of the garage doors to the property line or for a distance of 18 feet outside of the garage, whichever is less.
  4. Skewed driveways cannot exceed a 10:1 angle with the driveway apron or the garage. Skews greater than 10:1 must be handled with a curved driveway.
  5. Curved driveways must be designed with a 10 foot minimum inside radius and a 24 foot outside radius.
  6. Tapered driveways cannot exceed a 10:1 angle of taper. When tapering greater than 10:1, minimum curves specified in Item 5 above shall be utilized.
  7. The length of the driveway is measured from the back of the apron to the center of the garage door.
  8. The use of roll top curb shall not be allowed as driveway entrances.

#### 4.600 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

##### A. Facility Planning

1. A Non-Motorized User Circulation System (NUCS) composed of sidewalks, shared use trails and/or on-street bicycle facilities shall be provided in non-residential zoning districts in accordance with the Zoning Ordinance and Land Subdivision Development Ordinance and in residential zoning districts as set forth in this section 4.600.
2. Facilities for non-motorized users may include the following:
  - a. sidewalks
  - b. shared used trails
  - c. on-street bicycle facilities: signed, shared roadway and striped bike lanes
  - d. nature or recreational trails
3. The following specific provisions for NUCS shall be made in residential, office, commercial and industrial areas and activity centers:
  - a. The NUCS shall provide access to destinations such as recreation, school, retail and commercial locations within the subdivision.
  - b. The NUCS shall be required to extend to the property boundaries of the project, shall tie into existing and previously approved planned systems, and shall provide for future additions to ensure continuity of the bicycle



and pedestrian system. When a sidewalk or trail is located outside of the VDOT right of way, it shall be contained within a public access easement that extends at least one (1) foot beyond the outside of the sidewalk or trail on both sides.

- c. Single Family Detached: Sidewalk on one side of curb and gutter roadways, and where required by the Zoning Ordinance.
- d. Townhouse, Multi-Family: Sidewalk in front of the units and to parking areas.
- e. Activity Centers (Playgrounds, pools, tot lots, recreation centers): Sidewalk or trail leading to the facility and/or crosswalks for safe pedestrian movement.
- f. Office and Commercial Areas: Sidewalk leading to facility and/or crosswalks for safe pedestrian movement.
- g. Along road frontages to provide safe and reasonable pedestrian inter-parcel access between developments and uses, where such access is set forth in the Zoning Ordinance as a performance standard.
- h. Sidewalks shall be provided on both sides of the roadway where such accommodation conforms with VDOT standards and allowances.
- i. Shared-use trails shall be provided in conjunction with shoulder and ditch roadway sections in developments in the Suburban Policy Area, the Transition Policy Area, the Joint Land Management Area, and in Rural Villages. **In developments** where lot sizes **of** one acre or less are **proposed** ~~planned~~, sidewalks may be provided in lieu of shared-use trails.

## B. General Design

Where sidewalks or trails are required, the following design requirements shall apply:

### 1. Sidewalks

- a. Sidewalks shall be constructed on a subgrade compacted to 95 percent density at optimum moisture content.
- b. Sidewalks shall be constructed to one of the following minimum cross-sections:
  - j. VDOT Type A-3 concrete to a minimum depth of four inches.
  - ii. Crushed stone, 4 inches thick, topped with 1.5 inches of asphalt.
  - iii. On well-drained soils only as defined in the Interpretative Guide to Soils in Loudoun County, 4 inches of asphalt.
  - iv. Alternate sections may be approved by the Director and, if applicable, VDOT.
- c. The maximum cross slope allowed for sidewalks shall be 1/4 inch per foot.
- d. Sidewalks within VDOT right-of-way shall be constructed to the standards of VDOT and as provided in this section.

- e. The sidewalk longitudinal slope shall be consistent with the adjacent roadway.
- f. VDOT standards for CG-12 handicap accessible ramps shall be provided at pedestrian roadway crossings on curb and gutter roadway sections.
- g. Sidewalks outside of the VDOT right-of-way shall have a minimum unobstructed width of (a) 5 feet for non-residential development, for development adjacent to roads depicted in the Countywide Transportation Plan, and for residential development sections where the average density exceeds ten (10) units per acre and (b) a 4-foot minimum unobstructed width for other applications.
- h. Pervious-surface sidewalks are a desired option for non-VDOT maintained sidewalks.

2. Shared-Use Trails

- a. Shared-use trails are generally asphalt and are intended to accommodate both bicyclists and pedestrians comfortably.
- b. Shared use trails shall comply with the General Design requirements set forth in subparagraphs 1.a, b, f and h above.
- c. Shared-use trails within VDOT right-of-way shall comply with VDOT standards.
- d. Shared-use trails outside of VDOT right-of-way shall be designed and constructed to conform to AASHTO standards, provided, however, that the minimum width shall be six (6) feet.

3. On-Street Bicycle Facilities

- a. On-Street Bicycle Facilities are bicycle lanes constructed as an integral portion of the roadway and may or may not be delineated by means of striping.
- b. If bicycle accommodations are provided on street, separate sidewalks or trails for pedestrians must be provided outside of the roadway.
- c. The design and construction of On-Street bicycle accommodations shall conform to AASHTO standards.
- d. On-Street bicycle accommodations shall be identified on all plats for applications proposing such accommodations as an element of the internal circulation for bicycles.
- e. Streets containing On-Street Bicycle Facilities shall have signage that adequately advises motorized vehicle operators that such streets contain such Facilities.

4. Nature or Recreational Trails

- a. To provide pathways for recreational or fitness use, for access to open space or for pedestrian connections to the NUCS, subdivisions may incorporate nature or recreational trails designed and constructed in accordance with the following subparagraphs. Such trails shall not substitute for sidewalks or trails that are part of the NUCS.
- b. Such trails that are designed exclusively as nature or recreational trails and are not part of the NUCS are not required to comply with minimum standards for sidewalks and trails set forth in sections 1 through 3 above. Trails should be constructed using pervious surface materials.
- c. Such trails should follow the natural topography as nearly as possible.
- d. Trails developed within a park site to be dedicated to the County shall comply with the guidelines set forth in the Loudoun County Department of Parks, Recreation and Community Services Construction and Design Guidelines in effect at the time construction commences.

#### 4.700 NAMING OF STREETS

Reference is made to the Loudoun County Codified Ordinances for information on the naming of street, street-type designations, and the process for street name reservations.

#### 4.710 ADDRESS PLAT AND ADDRESSING PREMISES

Reference is made to the Loudoun County Codified Ordinances and the Loudoun County Land Subdivision and Development Ordinance for information on the determination of addresses, developing and obtaining addresses, display and posting of addresses, and address plat documentation requirements.

#### 4.800 SIGNS

##### 4.810 FIRE LANE SIGNS

- A. Reference is made to the Loudoun County Codified Ordinances for information relating to the fire lane sign types, size and installation specifications.
- B. Fire Lane signs shall be installed at the beginning of a designated Fire Lane and at the end of a designated fire lane with directional arrows pointing in. In addition, curbing shall be painted yellow with "Fire Lane" stenciled in black on the curbing every 50 feet of the fire lane in 4 inch letters within attached and multi-family developments.
- C. Fire lane signs shall be installed for the following categories of private roadways and parking lot travelways, including compacted shoulders if applicable, as defined in Chapter 4 of this manual, unless parking is prohibited along private streets/private access easements through owner's association documents or deed restrictions; or unless the roadway is part of an application in a Zoning District permitting a density of no greater than 1 lot for 3 acres in accordance with the following:
  - 1. Travelways with a total width up to 24 feet shall require fire lane signs on both sides of the road.
  - 2. Travelways with a total width of over 24 feet and up to 29 feet shall require fire lane signs on one side of the road.
  - 3. Travelways with a total width exceeding 29 feet shall not require fire lane signs.
  - 4. Commercial buildings shall require fire lane signs along the frontage of the building and at other building access points, as designated by the Fire Marshall.
  - 5. Public pools shall provide fire lane signs at the entrance to the secured entrance/access for emergency vehicles.

##### 4.820 STREET NAME SIGNS

Permanent street name signs shall be installed and maintained in accordance with the specifications contained within the Loudoun County Codified Ordinances.

Temporary street names signs are required and shall be installed within 24 hours of completion of clearing and in close proximity to each intersection location. Temporary street name signs shall meet the specifications contained within the Loudoun County Codified Ordinances (Chapter 1021) with the exception that a temporary post may be used in lieu of the 2" x 2" square galvanized steel post required by the Ordinance. Temporary signs shall be maintained until permanent signs are installed.

If the construction entrance for a work site is not at the location of a future street, it shall be marked with a street name sign for the nearest future street no later than the day of the preconstruction conference.

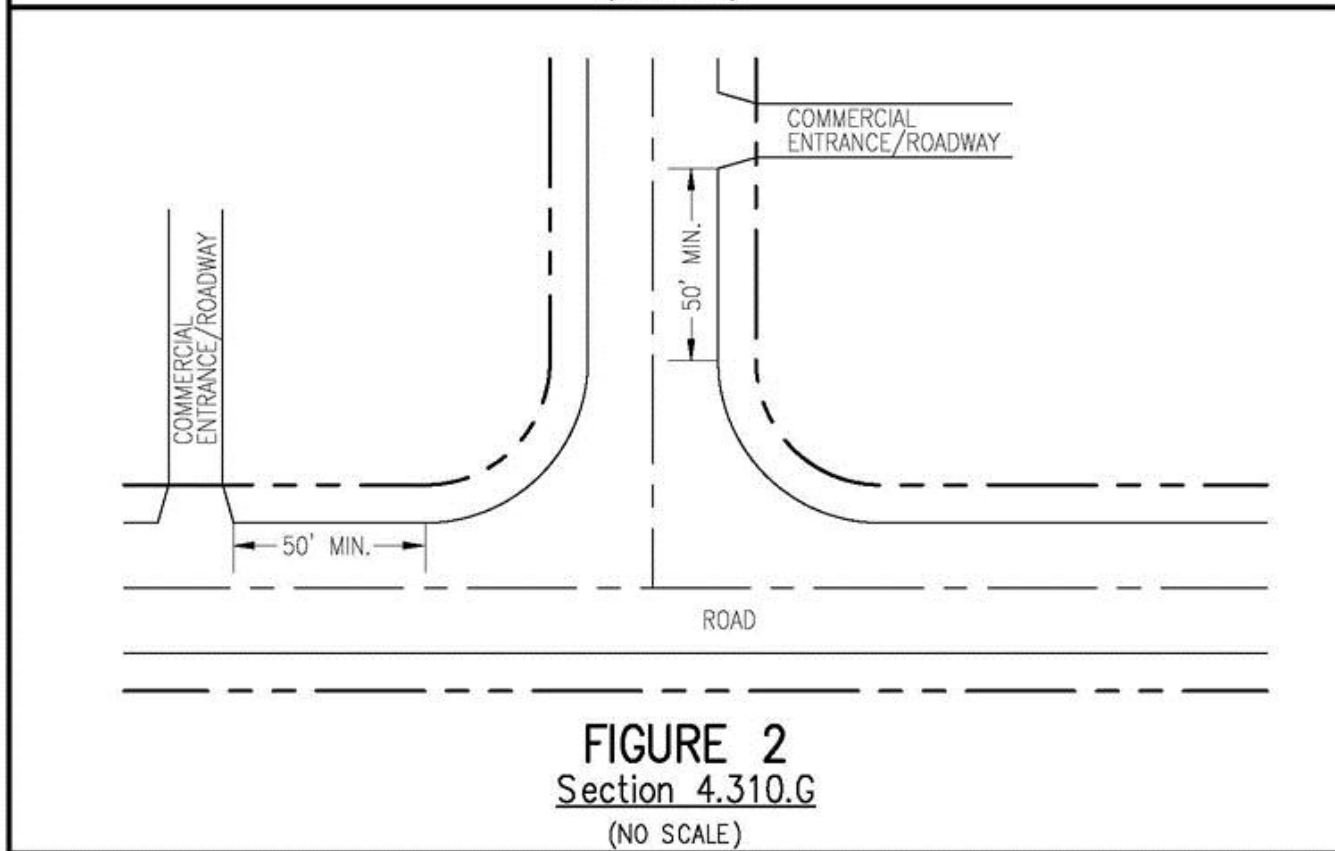
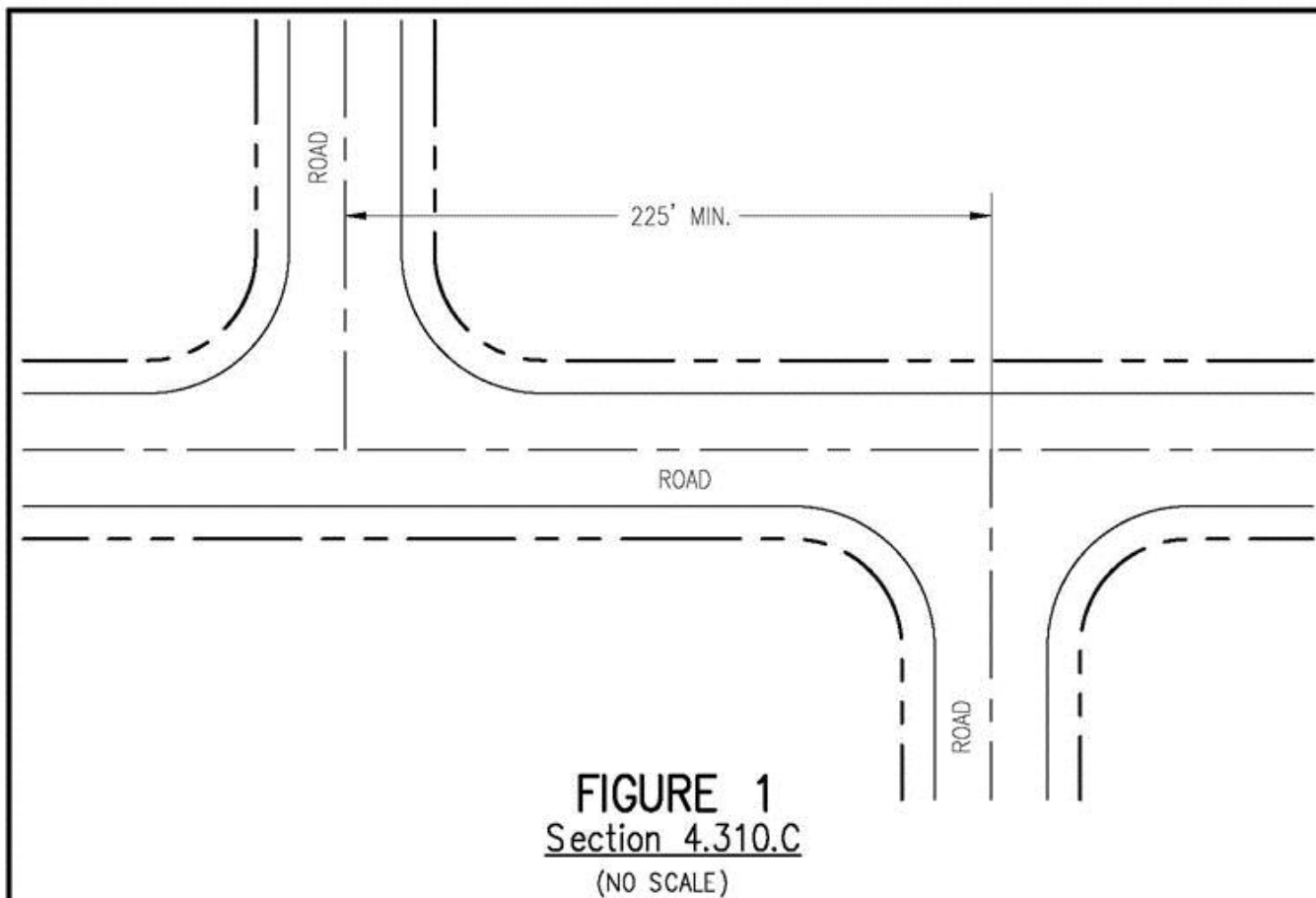
All new or modified mast arm traffic signal structures shall incorporate mast arm-mounted street name signage and all required regulatory signage. The street name signage shall be capable of properly identifying all intersection legs.

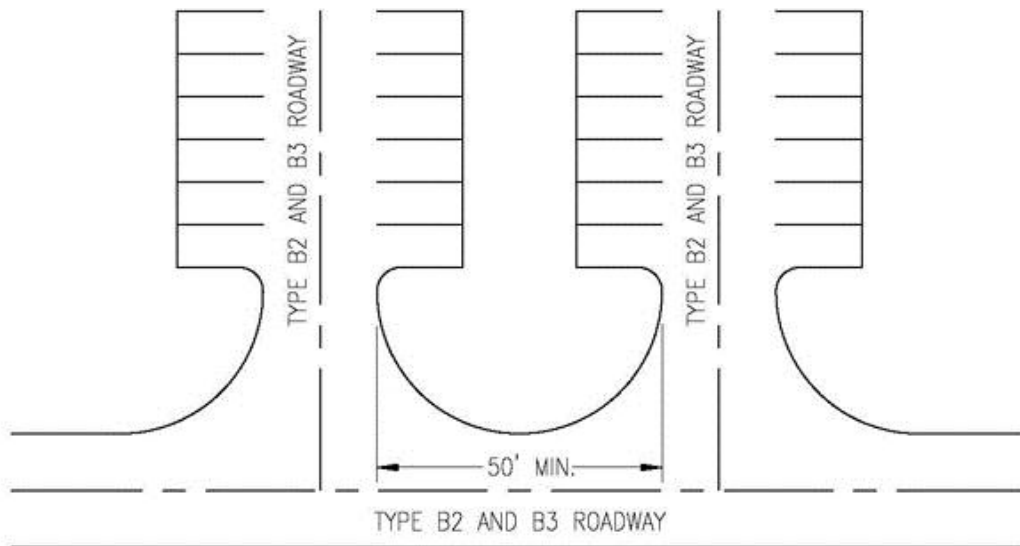
#### 4.830 HANDICAP SIGNS

Handicap signs shall be provided on the plans in accordance with the specifications set forth in the American With Disabilities Act of 1990, as amended.

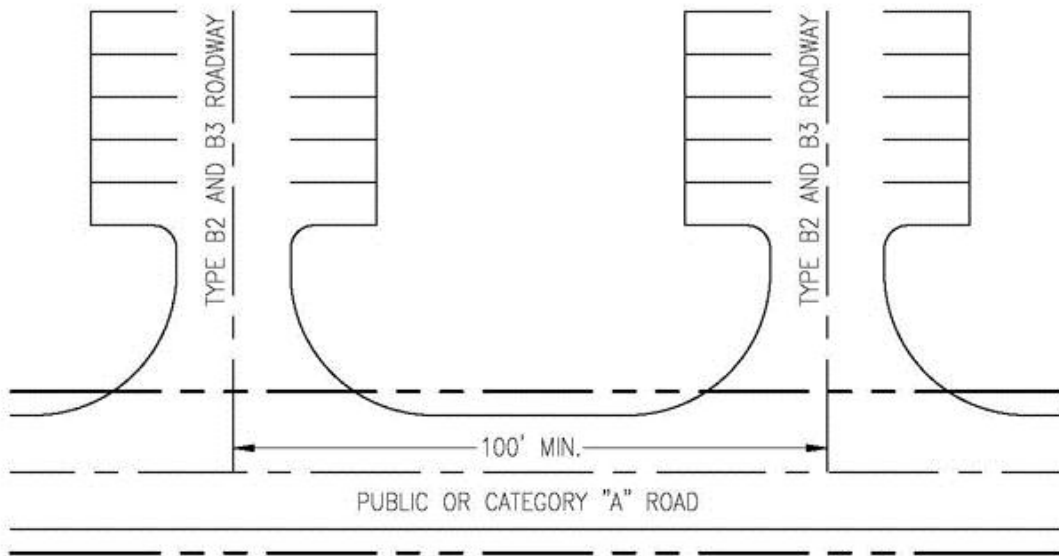
#### 4.900 PUBLIC TRANSIT BUS SHELTER STANDARDS

When a public transit bus shelter is proffered or otherwise provided, the shelter shall be designed and constructed to meet the County adopted Standard for Public Transit Bus Shelters as available at the Office of Transportation Services.

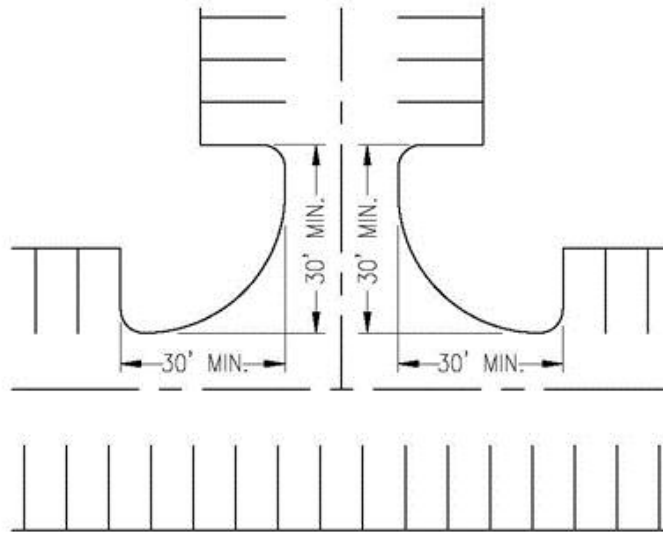




**FIGURE 3**  
Section 4.330.C.2  
 (NO SCALE)

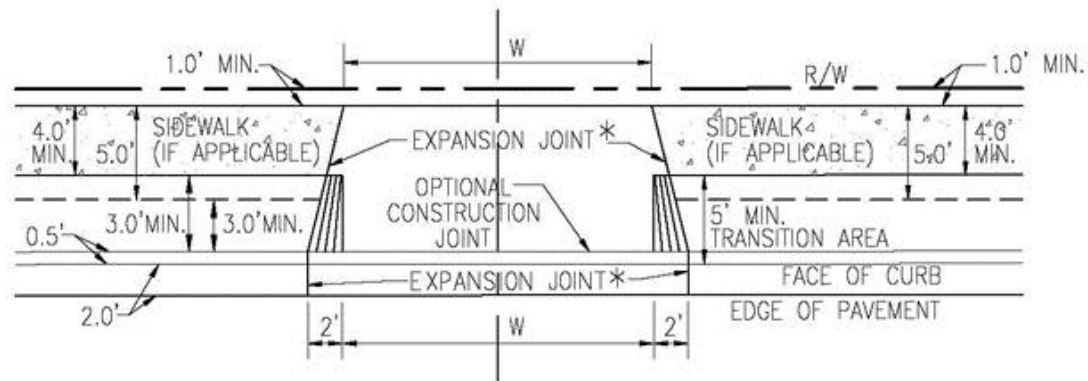


**FIGURE 4**  
Section 4.330.C.4  
 (NO SCALE)

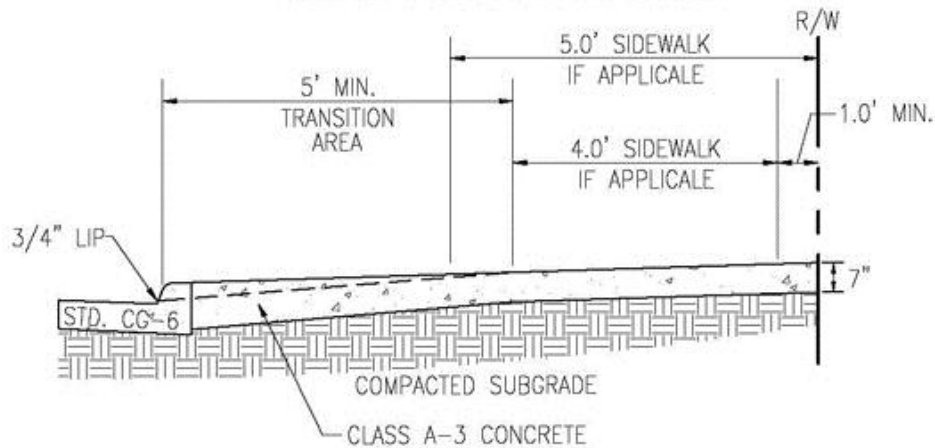


**FIGURE 5**  
Section 4.330.C.5  
(NO SCALE)





\* NOTE: CONTROL JOINTS MAY BE USED IN PLACE OF EXPANSION JOINTS ON PRIVATE STREETS.



ENTRANCE TYPE	MINIMUM APRON WIDTH (W)
TOWNHOUSE DRIVEWAY ENTRANCE	10'
SINGLE CAR GARAGE DRIVEWAY ENTRANCE	12'
MULTICAR GARAGE DRIVEWAY ENTRANCE (1) GREATER THAN 35' IN LENGTH	12'
MULTICAR GARAGE DRIVEWAY ENTRANCE (1) LESS THAN 35' IN LENGTH	18' (2)

NOTE: (1) DRIVEWAY LENGTH IS MEASURED FROM THE CENTER OF THE BACK OF THE CONCRETE APRON TO THE CENTER OF THE GARAGE FACE WHERE THE DOOR(S) ARE LOCATED.

(2) MINIMUM WIDTH SHALL BE THE GREATER OF 18' OR THE WIDTH ACHIEVED BY NECKING THE DRIVEWAY AT A 10:1 ANGLE STARTING 18' OUTSIDE THE GARAGE DOOR.

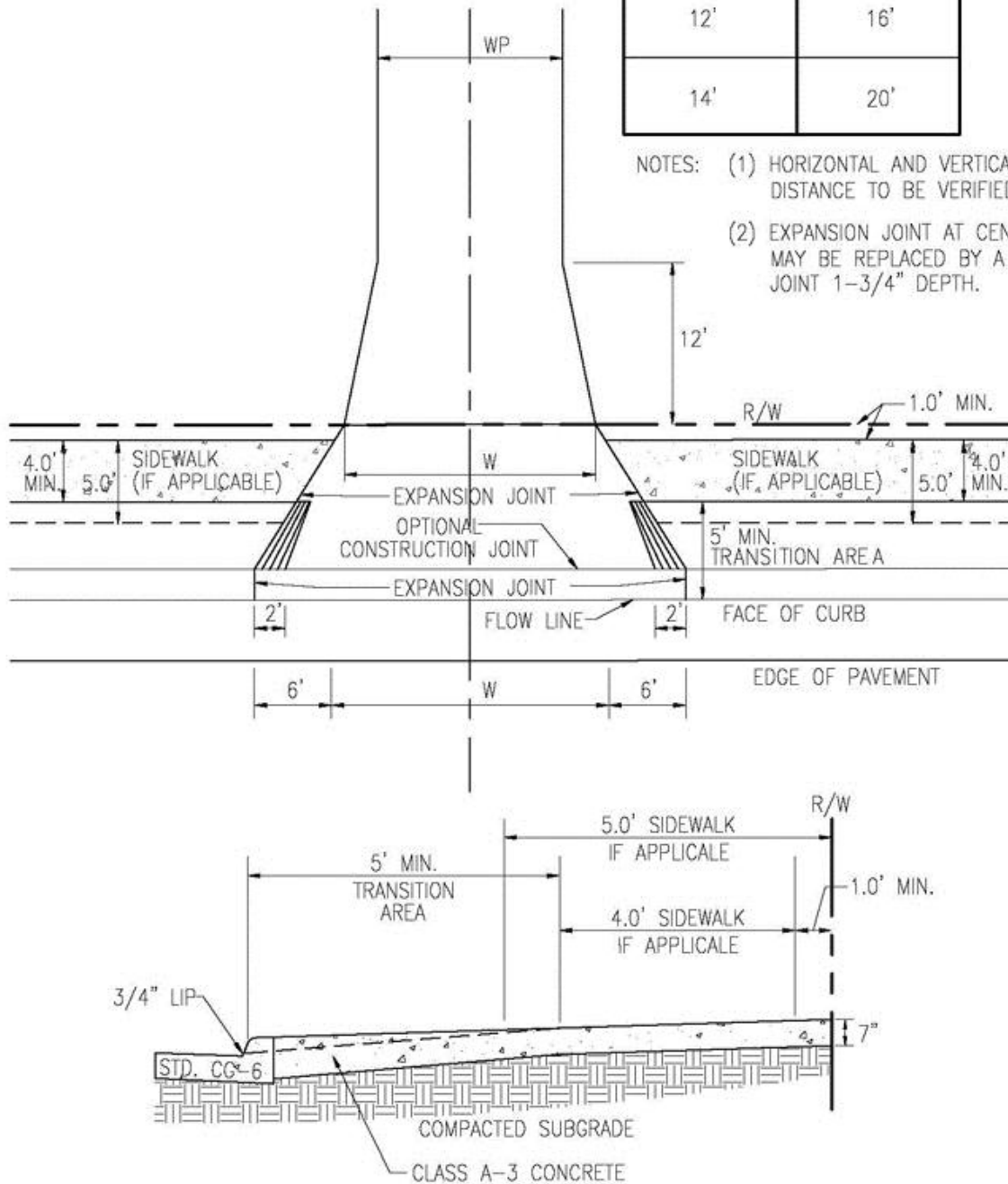
## STANDARD CURB AND GUTTER INDIVIDUAL DRIVEWAY ENTRANCE

(NO SCALE)

FIGURE 6

PIPESTEM DRIVE WIDTH (WP)	MIN. APRON WIDTH (W)
12'	16'
14'	20'

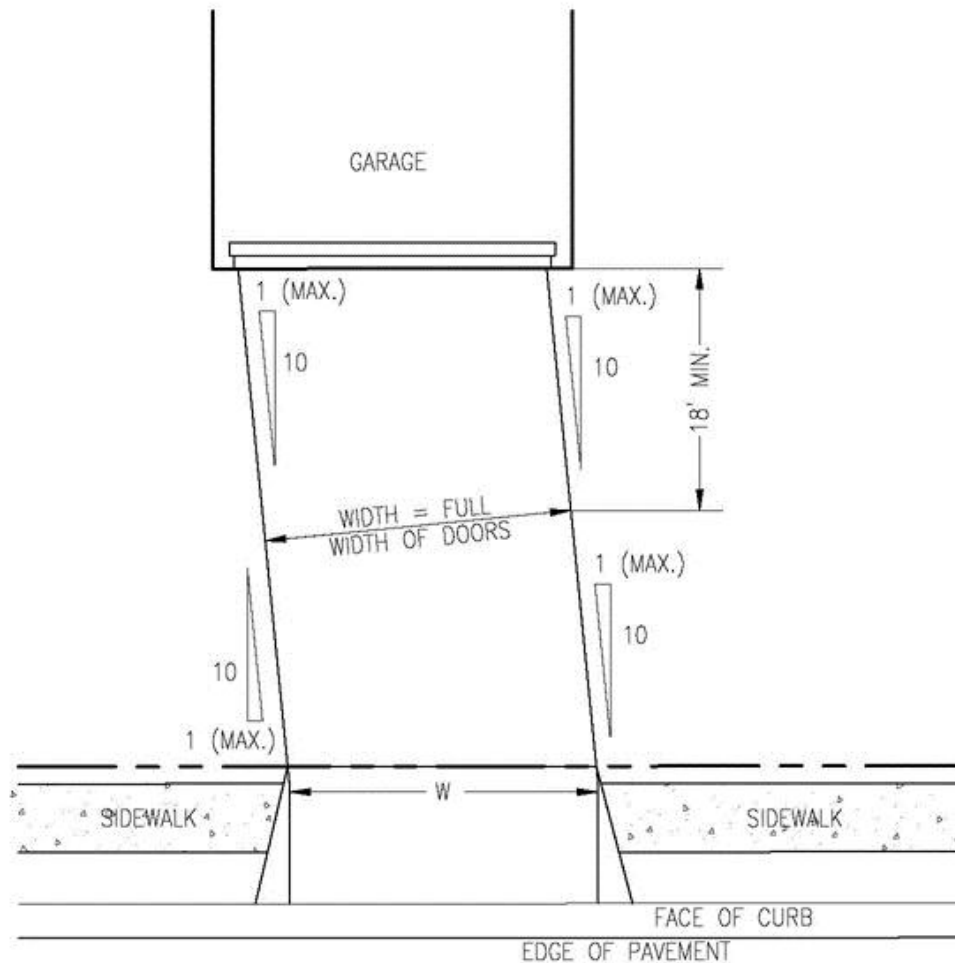
- NOTES: (1) HORIZONTAL AND VERTICAL SIGHT DISTANCE TO BE VERIFIED.  
 (2) EXPANSION JOINT AT CENTERLINE MAY BE REPLACED BY A CONTROL JOINT 1-3/4" DEPTH.



## STANDARD PIPESTEM DRIVEWAY ENTRANCE

(NO SCALE)

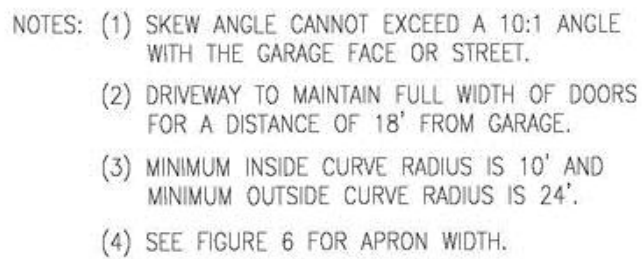
FIGURE 7

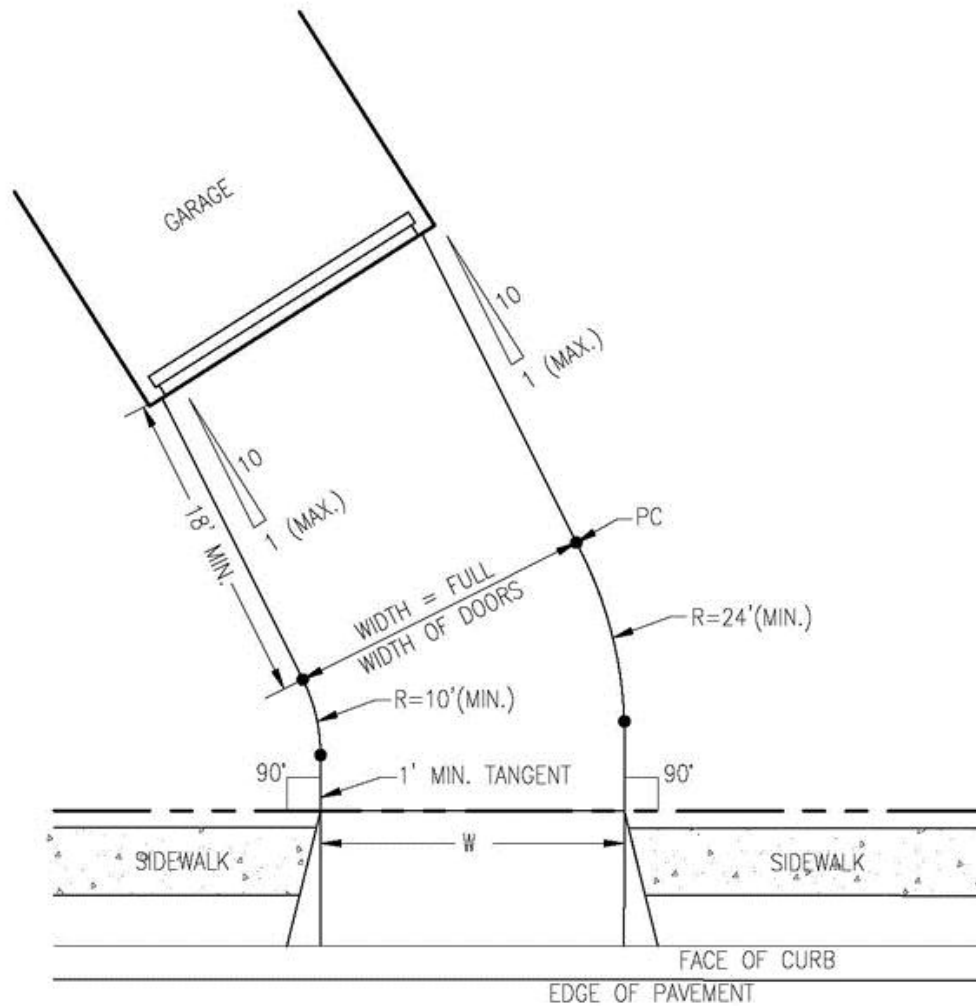


- NOTES: (1) SKEW ANGLE CANNOT EXCEED A 10:1 ANGLE WITH THE GARAGE FACE OR STREET.
- (2) DRIVEWAY TO MAINTAIN FULL WIDTH OF DOORS FOR A DISTANCE OF 18' FROM GARAGE.
- (3) SEE FIGURE 6 FOR APRON WIDTH.

**STANDARD DRIVEWAY DETAIL**  
**(DRIVEWAY LENGTH SHORTER THAN 35')**  
 (NO SCALE)

**FIGURE 8**



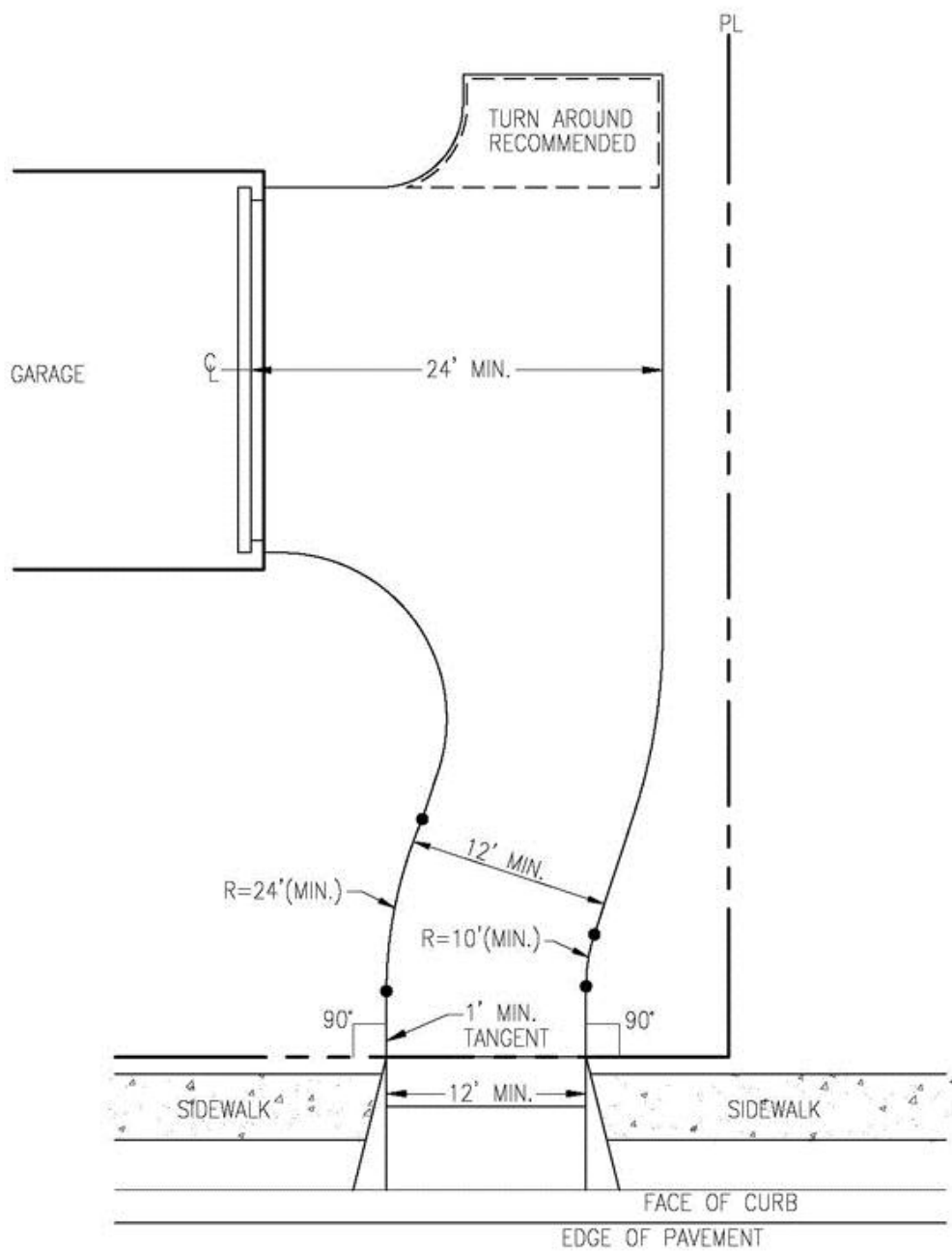


- NOTES: (1) SKEW ANGLE CANNOT EXCEED A 10:1 ANGLE WITH THE GARAGE FACE.
- (2) DRIVEWAY TO MAINTAIN FULL WIDTH OF DOORS FOR A DISTANCE OF 18' FROM GARAGE.
- (3) DRIVEWAY MUST BE PERPENDICULAR TO THE APRON FOR A MINIMUM DISTANCE OF 1'.
- (4) MINIMUM INSIDE CURVE RADIUS IS 10', AND MINIMUM OUTSIDE CURVE RADIUS IS 24'.
- (5) SEE FIGURE 6 FOR APRON WIDTH.

## STANDARD CURVED DRIVEWAY DETAIL

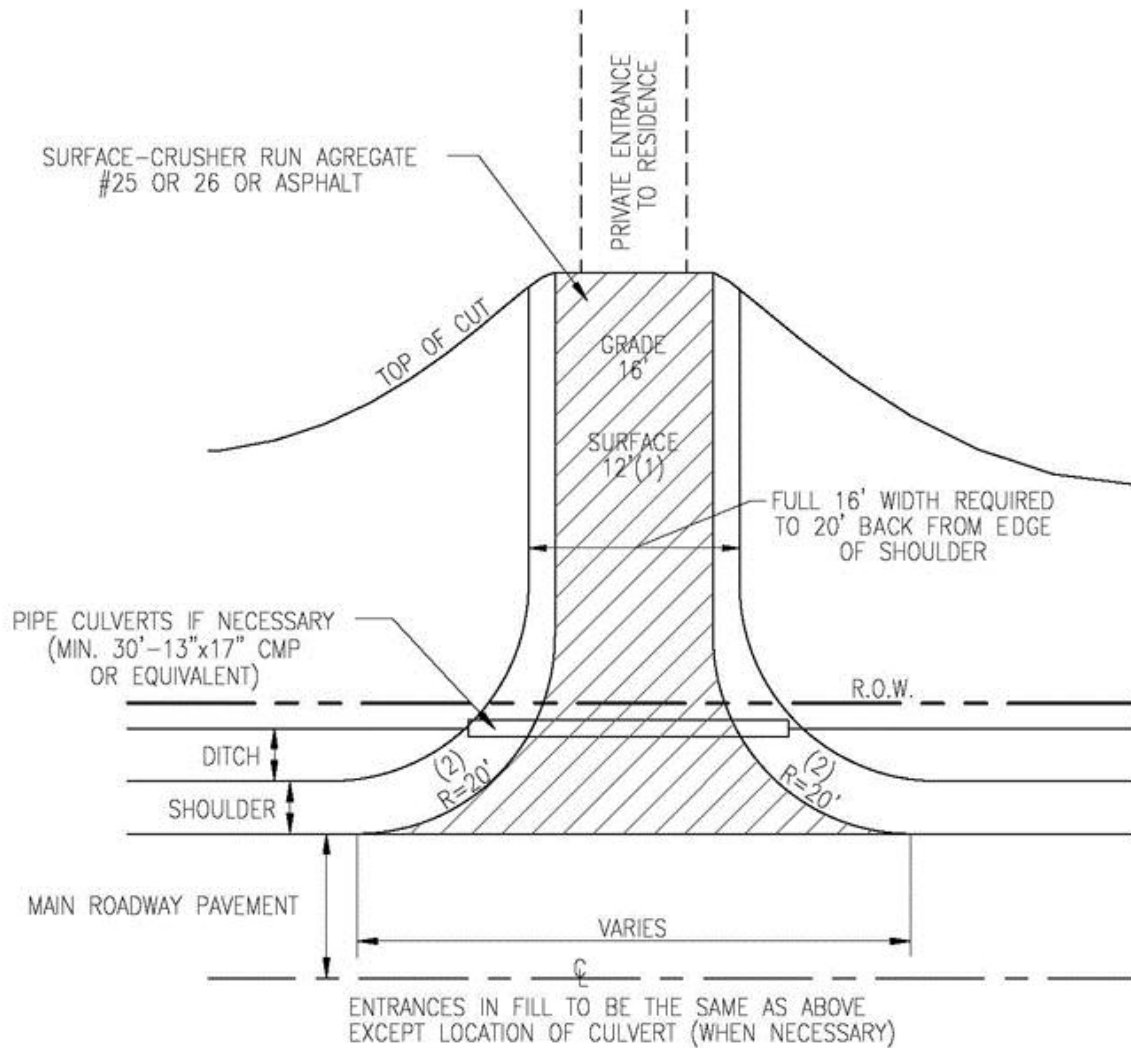
(NO SCALE)

FIGURE 10



**STANDARD SIDE LOAD DRIVEWAY DETAIL**  
**(DRIVEWAY LONGER THAN 35')**  
 (NO SCALE)

**FIGURE 11**



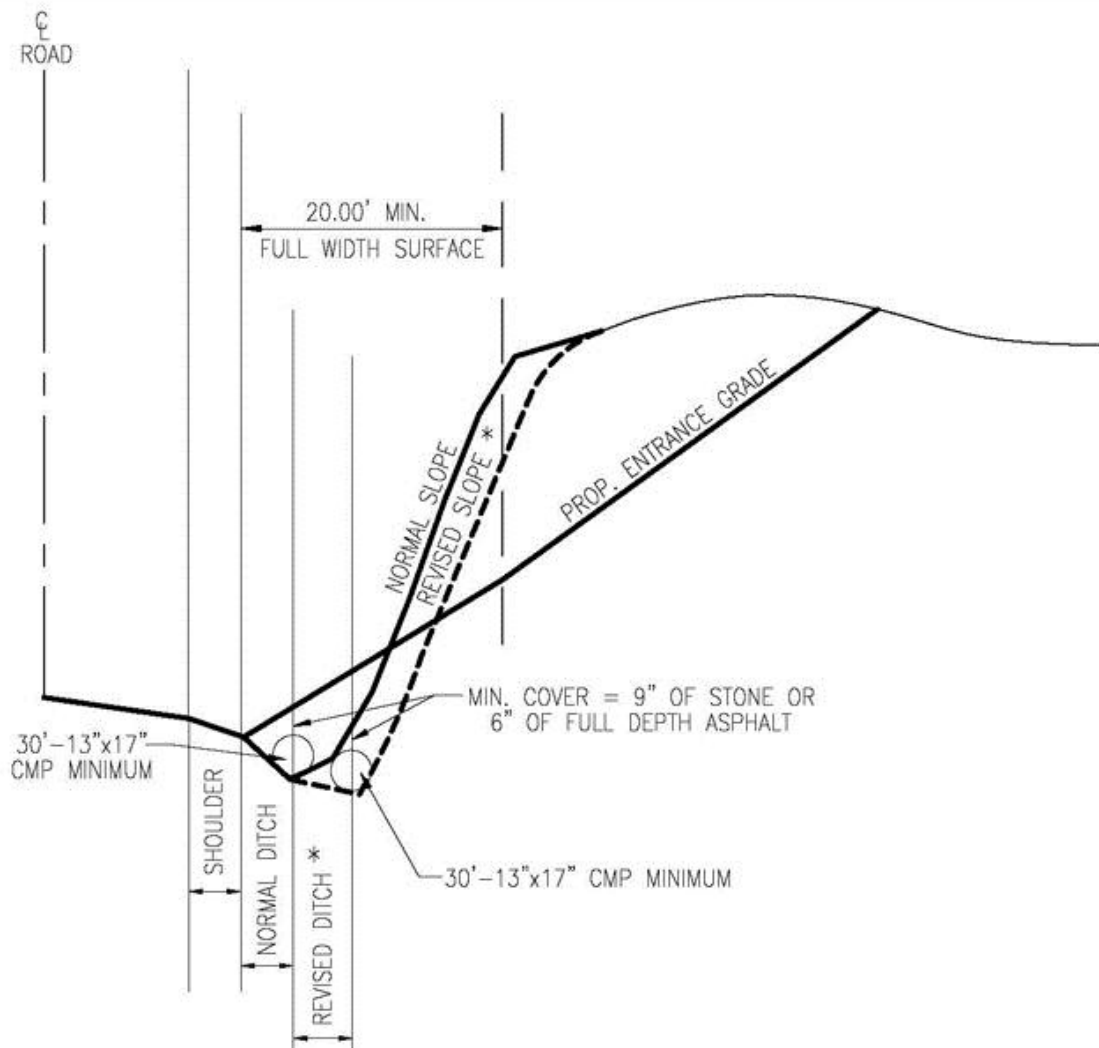
NOTE: ALL ENTRANCE GRADES SHALL START BACK OF THE SHOULDER LINE. IF DRAINAGE IS NECESSARY, THE DITCH LINE MAY BE MOVED BACK TO PROVIDE AT LEAST 9" OF GRAVEL OR 6" FULL DEPTH ASPHALT OVER PIPE.

- (1) 12' OR EXISTING WIDTH WHICHEVER IS GREATER
- (2) RADIUS MAY BE REDUCED TO 15' IF APPROVED BY V.D.O.T. .

## STANDARD PRIVATE DRIVEWAY ENTRANCE FOR SHOULDER SECTIONS VDOT ROADS

(NO SCALE)

FIGURE 12



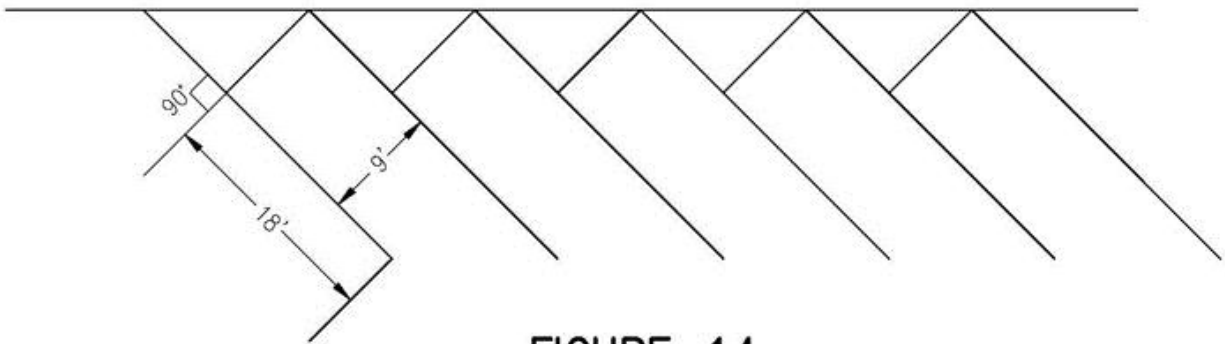
NOTE: LENGTHS OF CULVERT SHOWN ON ROAD PLANS FOR ENTRANCES ARE APPROXIMATE AND SHALL BE ADJUSTED TO OBTAIN ABOVE ROADWAY WIDTHS.

\* IF REVISED DITCH EXTENDS BEYOND ROAD RIGHT OF WAY, AN EASEMENT IS REQUIRED.

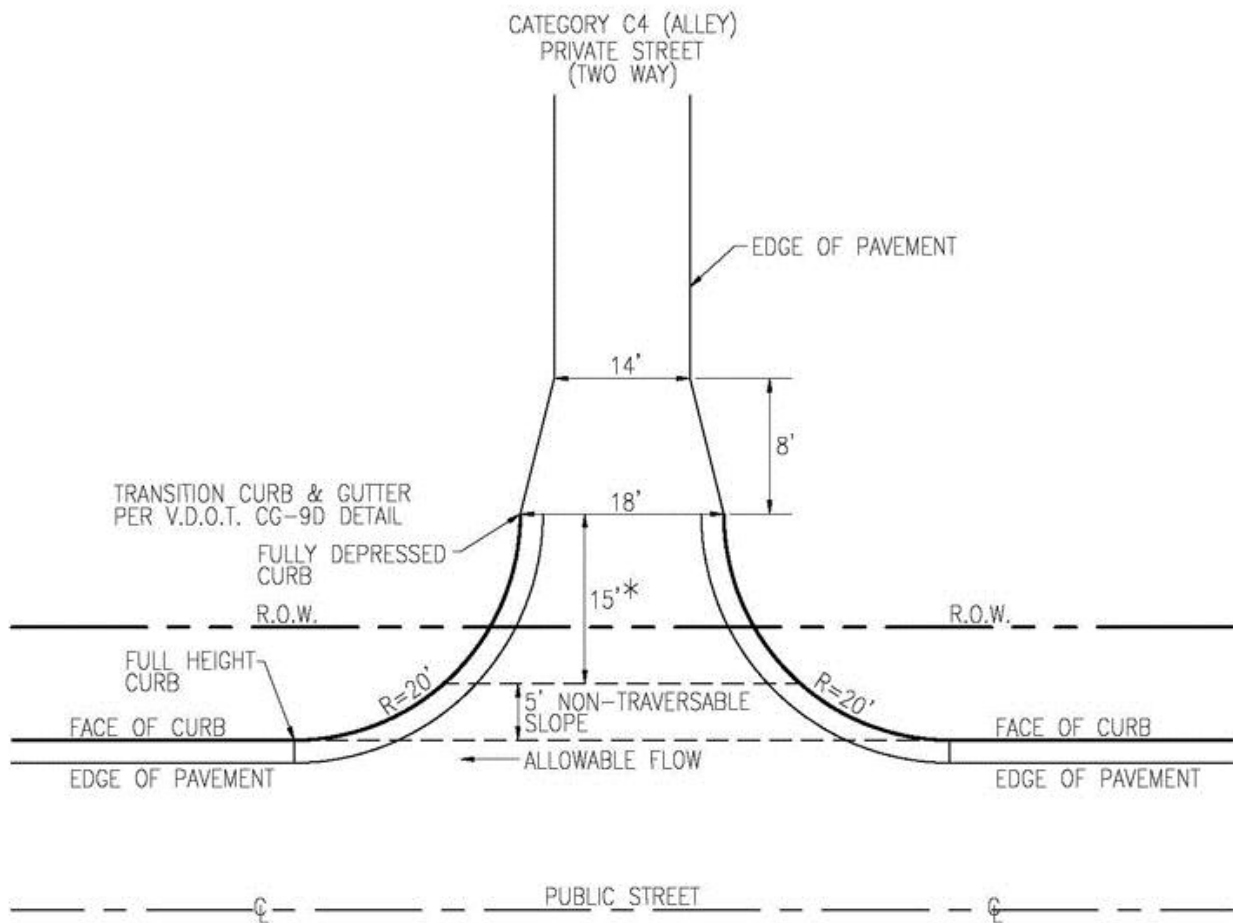
# **CROSS SECTION FOR STANDARD PRIVATE DRIVEWAY ENTRANCE FOR SHOULDER SECTIONS VDOT ROADS** (NO SCALE)

**FIGURE 13**





**FIGURE 14**  
Section 4.400.B.1  
(NO SCALE)



\* IF ACCESSIBLE ROUTES ARE BEING PROVIDED,  
A MINIMUM 4' TRAVERSABLE WIDTH IS  
REQUIRED WITH A MAX. 2% CROSS SLOPE.  
ACCESSIBLE ROUTE TO BE PROVIDED IN  
THIS AREA, NO CG-12 IS REQUIRED.

# ALLEY ENTRANCE TO PUBLIC STREET (NO SCALE)

FIGURE 15